

NEW COMBINATIONS IN SHARPSHOOTER LEAFHOPPERS
(HEMIPTERA: CICADELLIDAE: CICADELLINAE)

STUART H. MCKAMEY

Systematic Entomology Laboratory, PSI, Agricultural Research Service, U.S. Department of Agriculture, c/o National Museum of Natural History, Smithsonian Institution P.O. Box 37012, MRC-168, Washington, D.C. 20560, U.S.A. (e-mail: smckamey@sel.barc.usda.gov)

Abstract.—Nine species-group name changes in Cicadellinae are proposed so that all species in the subfamily can be listed in a single classification that is aligned with the International Code of Zoological Nomenclature. *Bothrogonia tangmaiana* Yang and Li and *Mareba panamensis* Young are fixed as the correct original spellings. Five **new combinations** are proposed: *Hadria alayoi* and *H. zayasi* (Dlabola and Novoa), *Caribovia intensa nigrinervis* (Schröder), and *Cicadella viridis suffusa* (Salmon), and *C. intermedia* (Rao). The combination *Cardioscarta flavifrons transversa* Melichar is reinstated. *Diedrocephala bimaculata* (Gmelin) is reinstated as the valid name for the species of the genus most often cited in literature and collections as *D. variegata* (Fabricius).

Key Words: Homoptera, Auchenorrhyncha, *Caribovia*, taxonomy

In the course of preparing a database of world leafhoppers, it became apparent that many purely nomenclatural changes were needed so that all species could be included in a single classification. These changes must be made separately, prior to WWW-based dissemination of the database, to avoid unwitting proliferation of unpublished taxonomy or of taxonomy that is not in accordance with the International Code of Zoological Nomenclature (ICZN; International Commission on Zoological Nomenclature 1999). For example, over 20 generic homonyms were discovered. Most of these generic changes were already made (McKamey 2003, McKamey 2006), including their affected species and one tribe. This is the first installment of species-level changes and is restricted to Cicadellinae *sensu stricto*, i.e., the tribes

Cicadellini and Proconiini, commonly called sharpshooters. Given the recency of comprehensive revisionary work and other descriptions, the required changes in Cicadellinae are fortunately few.

World sharpshooters were revised by Young (1968, 1977, 1986) and since the relevant portions of Young's revision, dozens of New World species have been added by various authors, principally by workers in Costa Rica (e.g., Godoy and Nielson 2000) and Brazil (e.g., Mejdalani et al. 2000, Cavichioli 2003). Old World additions include dozens more species, from more countries and by more authors (e.g., Ara and Ahmed 1988, Hayashi and Arai 1990, Chiang and Knight 1991, Ge and Zhang 1991, Huang 1992, Li and Wang 1992, Kuoh and Zhang 1992, Cai and Kuoh 1995, Yang and Zhang 2001). All this work together, however, indicates

that wherever there are active workers, new species are still being discovered at a rapid pace, suggesting a vast number still await discovery.

This probability is especially important considering the role of sharpshooters in transmitting pathogenic bacteria such as *Xylella fastidiosa*, the species responsible for Citrus Variegated Chlorosis in oranges (Milanez et al. 2003), Crespera disease in coffee (Rodríguez et al. 2001), and Pierce's Disease in grapes (Almeida and Purcell 2003).

TAXONOMY

Bothrogonia tangmaiana Yang and Li,
fixed spelling

Bothrogonia tangmaiana Yang and Li
1980: 203 [n. sp.].

Mareba panamensis Young,
fixed spelling

Mareba panamensis Young 1968: 64
[n.sp.].

The principle of first reviser (ICZN Art. 24) is applied here to fix the spelling of both species, which were spelled in two ways within the original descriptions. The spelling "*tongmaiana*" is deemed incorrect because the species was collected in Tangmai, China. This fixation is not meant to reflect its taxonomic status. Young (1986) synonymized *B. tongmaiana* [sic] Yang and Li (1980) under *B. curvata* Yang and Li (1980). Young (1968: 63) misspelled the Panamanian species as "*panamenis*."

Hadria alayoi (Dlabola and Novoa),
new combination

Arezzia alayoi Dlabola and Novoa 1976:
2 [n.sp.].

Hadria zayasi (Dlabola and Novoa),
new combination

Arezzia zayasi Dlabola and Novoa 1976:
4 [n.sp.].

Dlabola and Novoa's (1976) new Cuban cicadellines were understandably not included in Young's (1977) revision of New World Cicadellini. Both species above were described under the genus *Arezzia* Metcalf and Bruner, which Young (1977) synonymized under *Hadria* Metcalf and Bruner. Dlabola and Novoa (1976) also referred to *Arezzia* the species *Hortensia conciliata* Metcalf and Bruner, which Young (1977) placed in *Hadria*.

Caribovia intensa nigrinervis (Schröder),
new combination

Tettigella intensa nigrinervis Schröder
1959: 66 [n.subsp.].

Young (1977) referred the nominate species, *Tettigonia intensa* Walker to his new genus *Caribovia* but was apparently unaware of the subspecies *Tettigella intensa nigrinervis* Schröder (1959). It merits mention that *Caribovia* species are known to feed on coffee. The generic placement of this El Salvadorean subspecies deserves reevaluation, as all other taxa in the genus, including *C. intensa*, are endemic to the Greater Antilles.

Cicadella viridis suffusa (Salmon),
new combination

Tettigella viridis suffusa Salmon 1954: 64
[n.subsp.].

Cicadella intermedia (Rao),
new combination

Tettigella intermedia Rao 1980: 190
[n.sp.].

Salmon (1954) described and illustrated the "variety" *Tettigella viridis suffusa* from Great Britain in a publication seemingly overlooked by the major compendia of Auchenorrhyncha: Metcalf (1964), Nast (1972), Oman et al. (1990), as well as Young (1968, 1977, 1986). Because Salmon (1954) did not unambiguously reveal that it was infra-

subspecific in rank, and the variety was described before 1961, it is deemed to be of subspecific rank (ICZN Art. 45.6.4). At the time Salmon described the subspecies, *Tettigella viridis* was the valid name of the nominate form. *Tettigella* China and Fennah was suppressed by the International Commission of Zoological Nomenclature (Opinion 647) making *Cicadella* the valid name (China 1963).

Rao (1980) described a new species from India in the suppressed name *Tettigella* (see above).

Cardioscarta flavifrons transversa
Melichar, **reinstated combination**

Cardioscarta flavifrons transversa Melichar 1932: 313 [n.subsp.].

Poeciloscarta flavifrons transversa (Melichar): Metcalf 1965: 67.

Poeciloscarta flavifrons transversa (Melichar, 1932) is another subspecies not included in Young's (1977) revision. It is here referred to the genus to which Young (1977) referred the nominate species, *Cardioscarta flavifrons* (Signoret). Both the nominate form and the subspecies are known only from Brazil.

Diedrocephala bimaculata (Gmelin),
reinstated validity

Cicada bimaculata Gmelin 1789a: 2106 [nom. nov. for *Cicada variegata* Fabricius 1775: 684].

Fabricius (1775: 684) described *Cicada variegata* and two pages later (Fabricius 1775: 686) described another *Cicada variegata*. These two nominal species are indeed different taxonomic species, the former a species in the cicadelline genus *Diedrocephala* Spinola (Membracoidea: Cicadellidae) and the latter now *Cixius variabilis* Metcalf (Fulgoroidea: Cixiidae).

In the absence of any other treatment, either homonym would need to be replaced under the current Code, as they

have not been considered congeneric after 1899 (Art. 23.9.5). Nevertheless, the name has already been replaced. Gmelin (1789), acting as first reviser (ICZN Art. 24.2), regarded the cicadellid *Cicada variegata* as a junior homonym and proposed *Cicada bimaculata* as its new name. Unfortunately this name has been overlooked and the name *Diedrocephala variegata* is in common usage.

Unfortunately the Zoological Code does not specifically mention homonyms published in the same work (and which are therefore neither senior nor junior homonyms), or when one of these is replaced and becomes by default the junior homonym. Although ICZN Art. 23.9.1 does mention prevailing usage, its intention is to help decide which of two homonyms is the junior and which is the senior, when each are described in different works. In the case of the cicadellid *Cicada variegata* there is no problem as the decision on priority has already been made (see above). In any case, even if the same prevailing usage criteria were used, although *Diedrocephala variegata* is a well-known species, its mention in the literature falls far short of the Code's requirements of prevailing usage to enable its maintenance as the valid junior homonym of the cixiid *Cicada variegata* or as the valid senior objective synonym of the leafhopper *Cicada bimaculata*. Hence, the valid name of the primary junior homonym is *Diedrocephala bimaculata* (Gmelin). *Diedrocephala bimaculata* is the most common and widely distributed species of the genus, occurring from Mexico southward through Paraguay and Argentina (Young 1977).

ACKNOWLEDGMENTS

I thank F. C. Thompson, L. L. Deitz, J. Brown, and two anonymous reviewers for helpful comments on previous drafts of the manuscript.

LITERATURE CITED

- Almeida, R. P. P. and A. H. Purcell. 2003. Transmission of *Xylella fastidiosa* to grapevines by *Homalodisca coagulata* (Hemiptera: Cicadellidae). *Journal of Economic Entomology* 96: 265–271.
- Ara, A. and M. Ahmed. 1988. Some new species of leafhoppers (Cicadellidae: Homoptera) from Pakistan. *Pakistan Journal of Zoology* 20(3): 289–297.
- Cai, P. and C. [L.]. Kuoh. 1995. A new record genus and five new species of Cicadellidae from China (Homoptera: Cicadelloidea). *Acta Entomologica Sinica* 38(4): 460–466.
- Cavichioli, R. R. 2003. *Fingeriana dubia* gen. nov. e sp. nov. de Cicadellini (Hemiptera, Auchenorrhyncha, Cicadellidae) do sudeste e sul do Brasil. *Revista Brasileira de Zoologia* 20(2): 247–249.
- Chiang, C. C. and W. J. Knight. 1991. Mileewanini of Taiwan. *Journal of Taiwan Museum* 44(1): 117–124.
- China, W. E. 1963. *Cicadella* Latreille, 1817 (Insecta, Hemiptera); validation under the plenary powers. *Bulletin of Zoological Nomenclature* 20(1): 35–38.
- Diabola, J. and N. Novoa. 1976. Dos nuevas especies del género *Arezzia* Metcalf y Bruner, 1936 (Homoptera: Auchenorrhyncha) y revisión de otras especies Cubanas. *Poeyana* 158: 1–27.
- Fabricius, J. C. 1775. *Ryngota*. *Systema Entomologiae, Sisten insectorum classes, ordines, genera, species, adiectis synonymis, locis, descriptionibus, observationibus, Korte*, 816 pp.
- Ge, Z. L. and Z. M. Zhang. 1991. A new genus and two new species of Cicadellidae (Homoptera: Cicadelloidea). *Acta Zoologica Sinica* 37(4): 367–370.
- Gmelin, J. F. 1789. *Insecta Hemiptera. Caroli a Linné Systema Naturae* 1(4): 1517–2224.
- Godoy, C. and M. W. Nielson. 2000. A review of the leafhopper genus *Acrulogonia* Young with descriptions of new species (Homoptera: Cicadellidae: Cicadellinae). *Entomological News* 111(2): 107–115.
- Hayashi, M. and K. Arai. 1990. Five new species of the genus *Pagaronia* Ball (Homoptera, Cicadellidae-Cicadellinae) from central Honshu, Esakia. *Special Issue* 1, 5–13.
- Huang, K. W. 1992. Evacanthini of Taiwan (Homoptera: Cicadellidae: Cicadellinae). *Bulletin of National Museum of Natural Science* 3: 159–185.
- International Commission on Zoological Nomenclature, *International Code of Zoological Nomenclature*. 4th ed. International Trust for Zoological Nomenclature, London, xxix + 306 pp.
- Kuoh, C. L. and Z. Zhang. 1992. [Three new species of the genus *Anatkina* (Homoptera: Cicadelloidea).] *Entomotaxonomia* 14(2): 111–115.
- Li, Z. Z. and L. Wang. 1992 [1991]. *Agriculture and Forestry Insect Fauna of Guizhou* (Homoptera: Cicadellidae.), Vol. 4. Guizhou Science and Technology Publishing House, Guiyang, 304 pp.
- McKamey, S. H. 2003. Some new generic names in the Cicadellidae (Hemiptera: Cicadellidae: Deltocephalinae, Selenocephalinae). *Proceedings of the Entomological Society of Washington* 105(2): 447–451.
- . 2006. Further new genus-group names in the Cicadellidae (Hemiptera). *Proceedings of the Entomological Society of Washington* 108: 502–510.
- Mejidalani, G., M. Felix, and D. M. Takiya. 2000. Description of a new species of *Amblyscartidia* Young from southeastern Brazil (Hemiptera: Cicadellidae: Cicadellinae). *Bollettino di Museo Regionale di Scienze Naturali Torino* 17(1): 131–139.
- Melichar, L. 1932. *Monographie der Cicadellinen. IV. Musei Nationalis Hungarici Annals* 27: 285–328.
- Metcalf, Z. P. 1964. *General Catalogue of the Homoptera. Fascicle VI. Cicadelloidea. Bibliography of the Cicadelloidea* (Homoptera: Auchenorrhyncha). United States Department of Agriculture, Agricultural Research Service, 349 pp.
- . 1965. *General Catalogue of the Homoptera. Fascicle VI. Cicadelloidea. Part 1. Tettigellidae*. United States Department of Agriculture, Agricultural Research Service, 730 pp.
- Milanez, J. M., J. R. P. Parra, I. A. Custódio, D. C. Magri, C. Cera, and J. R. S. Lopes. 2003. Feeding and survival of citrus sharpshooters (Hemiptera: Cicadellidae) on host plants. *Florida Entomologist* 86(2): 154–157.
- Nast, J. 1972. *Palaearctic Auchenorrhyncha* (Homoptera): An Annotated Check List. Institute of Zoology, Polish Academy of Sciences, Polish Scientific Publisher, Warsaw, 550 pp.
- Oman, P. W., W. J. Knight, and M. W. Nielson. 1990. *Leafhoppers (Cicadellidae): a Bibliography, Generic Check-list and Index to the World Literature 1956–1985*. CAB International Institute of Entomology, Wallingford, UK, [iv] + 368 pp.
- Rao, K. R. 1980. Studies on cicadellid collections from Manipur (Hemiptera: Cicadellidae). *Records of the Zoological Survey of India* 76: 189–194.
- Rodríguez, C. M., J. J. Obando, W. Villalobos, L. Moreira, and C. Rivera. 2001. First report of *Xylella fastidiosa* infecting coffee in Costa

- Rica. Plant Disease D-2001-0723-02N (on-line; URL: <http://www.apsnet.org/pd/+toc/2001/dse01tc.htm>).
- Salmon, M. A. 1954. A new variety of *Tettigella viridis* (L) (Cicadellidae) and other Auchenorrhyncha [sic] from central south Wales. *Entomologist* 87: 64–68.
- Schröder, H. 1959. Taxonomische und tiergeographische Studien an Neotropischen Zikaden (Cicadellidae, Tettigellinae). *Abhandlungen Senckenbergischen Naturforschenden Gesellschaft* 499: 1–93.
- Yang, C. and F. Li. 1980. Notes on *Bothrogonia* (Homoptera, Cicadellidae) with descriptions of 22 new species from China. *Entomotaxonomia* 2(3): 191–213.
- Yang, M. and Y. Zhang. 2001 [2000]. Two new genera and two new species of Cicadellinae (Homoptera: Cicadellidae) from Yunnan Province, China. *Entomotaxonomia* 23(3): 169–174.
- Young, D. A. 1968. Taxonomic study of the Cicadellinae (Homoptera, Cicadellidae). Part 1. Proconiini. United States National Museum Technical Bulletin 261, 287 pp.
- . 1977. Taxonomic study of the Cicadellinae (Homoptera: Cicadellidae). Part 2. New World Cicadellini and the genus *Cicadella*. North Carolina Agricultural Experiment Station Technical Bulletin 239, 1,135 pp.
- . 1986. Taxonomic study of the Cicadellinae. Part 3. Old World Cicadellini. North Carolina Agricultural Research Service Technical Bulletin 281, vi + 639 pp.